

SCOPE FOR REHABILITATION
BRIDGE NO. 03322
I-84 RAMPS 181 & 184 OVER I-84 AND I-84 RAMP 181
CITY OF NEW BRITAIN
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Bridge No. 03322 is a five span bridge consisting of a steel multi-girder superstructure with a reinforced concrete deck on reinforced concrete abutments and piers. This structure, built in 1969, carries I-84 Ramps 181 and 184 over I-84 and I-84 Ramp 181 in New Britain, Connecticut. The structure has various span lengths with a maximum of 101 feet and an overall length of 430 feet. The curb-to-curb width is 53.8 feet, which consists of two 12-foot travel lanes with varying shoulder widths separated by a 10-foot wide raised concrete median. The overall deck width is 59.5 feet, and the approach roadway width is 54 feet. The 2011 Average Daily Traffic (ADT) on the bridge is 2,520 vehicles. The 2012 ADT on I-84 at the bridge is 78,400 vehicles.

The reinforced concrete deck is in satisfactory condition (Overall Rating = 6). The bituminous concrete overlay exhibits cracking and paving seams that are open up to ½" wide. The underside of the deck has hairline cracking with random dampness, rust stains, and efflorescence. The maximum underside of deck deterioration is estimated to be 6.6% in span 1 (labeled west to east) and the total deck deterioration is 3.9%. There are hollow areas, spalls with exposed rebar, honeycombing and light scale. The asphaltic plug joints have cracks open up to 2" at the shoulders. The raised median also has hollow areas, scaling, and spalls up to 3" deep. The median guide railing has minor impact damage throughout. The concrete parapets exhibit cracking and scrape marks and there is a spall at the northwest corner. The steel bridge railing has random bent and damaged posts. There is one clogged scupper in span 3, which is clogged at the bell/hopper; there is a partially clogged scupper in span 4.

The superstructure is in fair condition (Overall Rating = 5). The steel girder webs have painted over section losses with light reoccurring rust. Repairs have been made to the previously noted severe section loss locations in the web since 2011. There are now four locations with over 5% section loss in the bottom flange, with a maximum of 14% loss in span 2 girder 1. The sliding bearings at the east abutment are over-expanded, with up to 7/16" loss of bearing contact, which may be due to abutment tipping. The elastomeric bearings have moderate to heavy bulging and varying degrees of rust, up to ¼" thick. The bearings have less than 5% loss of bearing due to pedestal spalls. The fixed bearings have laminated rust.

The substructure is in poor condition (Overall Rating = 4). The east abutment stem is tipped up to 1" over a height of 4'. The joints between the east abutment and wingwalls are open up to 1" wider at the top than the bottom. The tops of the northeast and southeast wingwalls are tipped outward up to 1". The wingwall bases are up to 3/8" laterally misaligned with the abutment stems. The pier caps and columns have large hollow areas, large spalls up to 4" deep with exposed rebar, and punky concrete. The piers also exhibit cracking with rust and efflorescence. Concrete pedestals at the piers have random spalls resulting in less than 5% undermining of the bearings. There is minor erosion along all wingwall embankments and at the east abutment from roadway runoff.

RECOMMENDED REHABILITATION

Based on field inspection of the existing structure the following rehabilitation measures are recommended:

- Replace joints over abutments and piers
- Mill deck, full and partial depth deck patch
- Place new membrane waterproofing and bituminous concrete across entire deck
- Clean and paint beam ends and bearing devices
- Repair substructure as necessary
- Repair parapets as necessary
- Place joint sealant between east abutment and wingwalls
- Replace east and west abutment expansion bearings with elastomeric bearings
- Repair superstructure steel as necessary

The proposed rehabilitation will be performed utilizing temporary lane shifts of the ramps. An 11-foot travel lane will be provided for each stage of construction. Each stage will consist of milling the existing bituminous overlay, replacing the membrane waterproofing, placing new bituminous and placing a new asphaltic plug expansion joint, half the bridge at a time. Repairs to the parapet can be performed during off-peak lane shifts while maintaining a minimum 12-foot travel lane.

Cleaning and painting of the beam ends and bearing devices, and most steel repairs and substructure repairs can be performed with no interruptions to I-84 traffic. Interruptions to I-84 Ramp 181 traffic under the bridge are anticipated to perform superstructure and substructure repairs to the western pier.